

THE ANNALS
of
MATHEMATICAL
STATISTICS

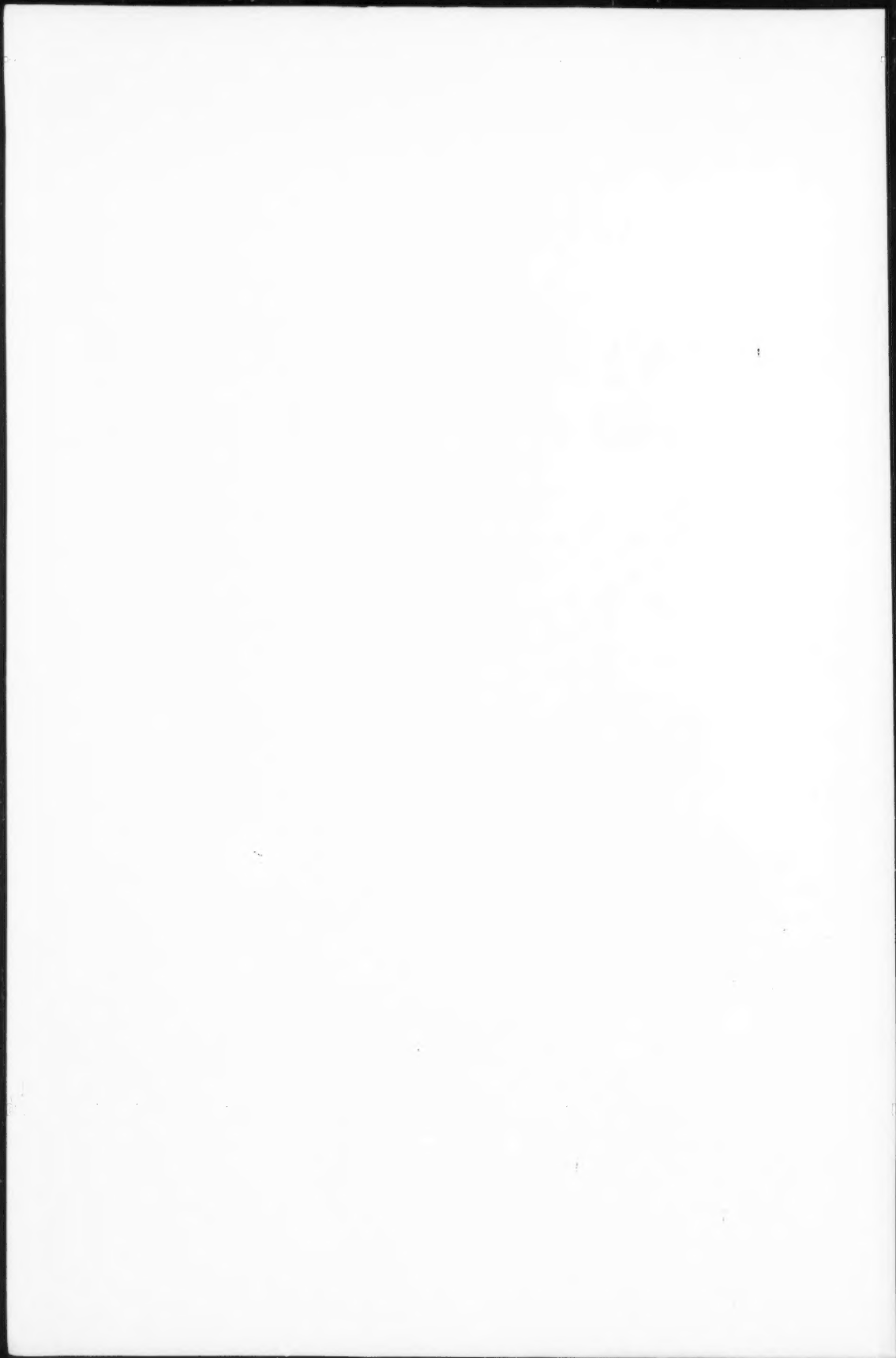
FOUNDED AND EDITED BY H. C. CARVER, 1930-1938

EDITED BY S. S. WILKS, 1938-1949

THE OFFICIAL JOURNAL OF THE INSTITUTE OF
MATHEMATICAL STATISTICS

VOLUME 35

1964



CONTENTS OF VOLUME 35

ARTICLES AND NOTES

ABRAHAMSON, I. G. Orthant Probabilities for the Quadrivariate Normal Distribution.....	1685-1703
ADAMS, JOHN W. AND KOTZ, SAMUEL. Distribution of Sum of Identically Distributed Exponentially Correlated Gamma-Variables.	277-283
ANDERSON, T. W. On Bayes Procedures for a Problem With Choice of Observations.....	1128-1135
ANDERSON, T. W. AND DAS GUPTA, S. Monotonicity of the Power Functions of Some Tests of Independence Between Two Sets of Variates.....	206-208
ANDERSON, T. W. AND DAS GUPTA, S. A Monotonicity Property of the Power Functions of Some Tests of the Equality of Two Covariance Matrices.....	1059-1063
ANDERSON, T. W., MUDHOLKAR, G. S. AND DAS GUPTA, S. Monotonicity of the Power Functions of Some Tests of the Multivariate Linear Hypothesis.....	200-205
ANDERSON, T. W. AND WALKER, A. M. On the Asymptotic Distribution of the Autocorrelations of a Sample From a Linear Stochastic Process.....	1296-1303
ATKINSON, F. V., CHURCH, J. D. AND HARRIS, B. Decision Procedures for Finite Decision Problems Under Complete Ignorance. . .	1644-1655
BAHADUR, R. R. On Fisher's Bound for Asymptotic Variances.....	1545-1552
BAIN, LEE J. AND WEEKS, DAVID L. A Note on the Truncated Exponential Distribution.....	1366-1367
BANERJEE, K. S. A Note on Idempotent Matrices.....	880-882
BANERJEE, K. S. AND FEDERER, W. T. Estimates of Effects for Fractional Replicates.....	711-715
BARGMANN, R. E. AND TRAWINSKI, IRENE MONAHAN. Maximum Likelihood Estimation With Incomplete Multivariate Data....	647-657
BARLOW, RICHARD E. AND MARSHALL, ALBERT W. Bounds for Distributions With Monotone Hazard Rate, I.....	1234-1257
BARLOW, RICHARD E. AND MARSHALL, ALBERT W. Bounds for Distributions With Monotone Hazard Rate, II.....	1258-1274
BARLOW, RICHARD E. AND PROSCHAN, FRANK. Comparison of Replacement Policies, and Renewal Theory Implications.....	577-589
BARTOO, J. B., SRIVASTAVA, O. P. AND HARKNESS, W. L. Asymptotic Distribution of Distances Between Order Statistics From Bivariate Populations.....	748-754
BASU, A. P. Effect of Truncation on a Test for the Scale Parameter of the Exponential Distribution.....	209-213
BELL, C. B. Some Basic Theorems of Distribution-Free Statistics..	150-156

BELL, C. B. A Characterization of Multisample Distribution-Free Statistics.....	735-738
BERK, KENNETH. An Evaluation of a Functional on Infinitely Divisible Stochastic Processes.....	336-340
BERMAN, SIMEON M. Limiting Distribution of the Maximum of a Diffusion Process.....	319-329
BERMAN, SIMEON M. Limit Theorems for the Maximum Term in Stationary Sequences.....	502-516
BHAT, R. R. Bayes Solution of Sequential Decision Problem for Markov Dependent Observations.....	1656-1662
BHUCHONGKUL, S. A Class of Nonparametric Tests for Independence in Bivariate Populations.....	138-149
BICKEL, PETER J. On Some Alternative Estimates for Shift in the P -Variate One Sample Problem.....	1079-1090
BIRCH, M. W. A New Proof of the Pearson-Fisher Theorem.....	817-824
BLACKWELL, DAVID. Memoryless Strategies in Finite-Stage Dynamic Programming.....	863-865
BLACKWELL, DAVID AND FREEDMAN, DAVID. The Tail σ -Field of a Markov Chain and a Theorem of Orey.....	1291-1295
BLACKWELL, DAVID AND FREEDMAN, DAVID. A Remark on the Coin Tossing Game.....	1345-1347
BLACKWELL, D., DEUEL, P. AND FREEDMAN, D. The Last Return to Equilibrium in a Coin Tossing Game.....	1344
BLUM, J. R. AND ROSENBLATT, JUDAH. On Random Sampling from a Stochastic Process.....	1713-1717
BLUMENTHAL, R. M. AND GETTOOR, R. K. A Theorem on Stopping Times.....	1348-1350
BOSE, R. C. AND SRIVASTAVA, J. N. On a Bound Useful in the Theory of Factorial Designs and Error Correcting Codes.....	408-414
BREAKWELL, JOHN AND CHERNOFF, HERMAN. Sequential Tests for the Mean of a Normal Distribution II (Large t).....	162-173
BREIMAN, LEO, LeCAM, LUCIEN AND SCHWARTZ, LORRAINE. Consistent Estimates and Zero-One Sets.....	157-161
BREIMAN, LEO AND WURTELE, ZIVIA S. Convergence Properties of a Learning Algorithm.....	1819-1822
BRETHERTON, M. H. AND WILLIAMSON, E. Tables of the Logarithmic Series Distribution.....	284-297
BROWN, L. Sufficient Statistics in the Case of Independent Random Variables.....	1456-1474
BURKE, P. J. The Dependence of Delays in Tandem Queues.....	874-875
BURR, E. J. Small-Sample Distributions of the Two-Sample Cramer-von Mises' W^2 and Watson's U^2	1091-1098
CAPON, JACK. Radon-Nikodym Derivatives of Stationary Gaussian Measures.....	517-531

CHANDRASEKHARARAO, K. AND RAGHAVARAO, D. Cubic Designs	389-397
CHAZAN, DAN. A Note on Convergence of Sub-Martingales	1811-1814
CHERNOFF, HERMAN AND BREAKWELL, JOHN. Sequential Tests for the Mean of a Normal Distribution II (Large t)	162-173
CHERNOFF, H. AND ZACKS, S. Estimating the Current Mean of a Nor- mal Distribution Which is Subjected to Changes in Time	999-1018
CHURCH, J. D., HARRIS, B. AND ATKINSON, F. V. Decision Proce- dures for Finite Decision Problems Under Complete Ignor- ance	1644-1655
COMER, JOHN P., JR. Some Stochastic Approximation Procedures for Use in Process Control	1136-1146
CONNELL, TERRENCE L. AND GRAYBILL, FRANKLIN A. Sample Size Required for Estimating the Variance Within d Units of the True Value	438-440
CROUSE, C. F. Note on Mood's Test	1825-1826
DALL'AGLIO, GIORGIO. Present Value of a Renewal Process	1326-1331
DANZIGER, L. AND DAVIS, S. A. Tables of Distribution-Free Toler- ance Limits	1361-1365
DARROCH, J. N. On the Traffic-Light Queue	380-388
DARROCH, J. N. On the Distribution of the Number of Successes in Independent Trials	1317-1321
DAS GUPTA, S. AND ANDERSON, T. W. A Monotonicity Property of the Power Functions of Some Tests of the Equality of Two Co- variance Matrices	1059-1063
DAS GUPTA, S., ANDERSON, T. W. AND MUDHOLKAR, G. S. Mono- tonicity of the Power Functions of Some Tests of the Multi- variate Linear Hypothesis	200-205
DAS GUPTA, S. AND ANDERSON, T. W. Monotonicity of the Power Functions of Some Tests of Independence Between Two Sets of Variates	206-208
DAVIS, S. A. AND DANZIGER, L. Tables of Distribution-Free Toler- ance Limits	1361-1365
DAYHOFF, EUGENE. On the Equivalence of Polylays of the Second Degree and Σ 's	1663-1672
DEMPSTER, A. P. Tests for the Equality of Two Covariance Mat- rices in Relation to a Best Linear Discriminator Analysis	191-199
DENNY, J. L. On Continuous Sufficient Statistics	1229-1233
DERMAN, CYRUS. On Sequential Control Processes	341-349
DEUEL, P., FREEDMAN, D. AND BLACKWELL, D. The Last Return to Equilibrium in a Coin Tossing Game	1344
DHARMADHIKARI, S. W. Exchangeable Processes Which are Func- tions of Stationary Markov Chains	429-430
DWASS, MEYER. Extremal Processes	1718-1725
DWYER, P. S. Properties of Polykays of Deviates	1167-1173

DWYER, P. S. AND TRACY, D. S. A Combinatorial Method for Products of Two Polykays With Some General Formulae.....	1174-1185
EAGLESON, G. K. Polynomial Expansions of Bivariate Distributions.....	1208-1215
ELLISON, BOB E. On Two-Sided Tolerance Intervals for a Normal Distribution.....	762-772
FABIUS, J. Asymptotic Behavior of Bayes' Estimates.....	846-856
FARRELL, R. H. Asymptotic Behavior of Expected Sample Size in Certain One Sided Tests.....	36-72
FARRELL, R. H. Limit Theorems for Stopped Random Walks.....	1332-1343
FARRELL, R. H. Estimators of a Location Parameter in the Absolutely Continuous Case.....	949-998
FEDERER, W. T. AND BANERJEE, K. S. Estimates of Effects for Fractional Replicates.....	711-715
FEDERER, W. AND ZELIN, M. Applications of the Calculus for Factorial Arrangements II: Two Way Elimination of Heterogeneity.....	658-672
FERGUSON, THOMAS S. A Characterization of the Exponential Distribution.....	1199-1207
FOLKS, JOHN LEROY AND JOHNSON, CHARLES HENRY. A Property of the Method of Steepest Ascent.....	435-437
FOSTER, F. G. AND PERERA, A. F. A. D. Queues with Batch Departures II.....	1147-1156
FOX, MARTIN AND RUBIN, HERMAN. Admissibility of Quantile Estimates of a Single Location Parameter.....	1019-1030
FREEDMAN, DAVID AND BLACKWELL, DAVID. A Remark on the Coin Tossing Game.....	1345-1347
FREEDMAN, DAVID AND BLACKWELL, DAVID. The Tail σ -Field of a Markov Chain and a Theorem of Orey.....	1291-1295
FREEDMAN, D., BLACKWELL, D. AND DEUEL, P. The Last Return to Equilibrium in a Coin Tossing Game.....	1344
GEBHARD, RICHARD F. A Limit Theorem for Random Interval Sampling of a Stochastic Process.....	866-868
GEBHARDT, FRIEDRICH. On the Risk of Some Strategies for Outlying Observations.....	1524-1536
GETOOR, R. K. AND BLUMENTHAL, R. M. A Theorem on Stopping Times.....	1348-1350
GHOSH, M. N. On the Admissibility of Some Tests of Manova.....	789-794
GHOSH, M. N. Uniform Approximation of Minimax Point Estimates.....	1031-1047
GILLILAND, DENNIS C. A Note on the Maximization of a Non-Central Chi-Square Probability.....	441-442
GIRI, N. On the Likelihood Ratio Test of a Normal Multivariate Testing Problem.....	181-190
GIRI, N. AND KIEFER, J. Local and Asymptotic Minimax Properties of Multivariate Tests.....	21-35

GIRI, N. AND KIEFER, J. Minimax Character of the R^2 -Test in the Simplest Case.....	1475-1490
GLSEER, LEON J. On a Measure of Test Efficiency Proposed by R. R. Bahadur.....	1537-1544
GNANADESIKAN, R. AND WILK, M. B. Graphical Methods for Internal Comparisons in Multiresponse Experiments.....	613-631
GOODMAN, LEO A. Interactions in Multidimensional Contingency Tables.....	632-646
GOODMAN, LEO A. Simultaneous Confidence Intervals for Contrasts Among Multinomial Populations.....	716-725
GRAYBILL, FRANKLIN A. AND CONNELL, TERRENCE L. Sample Size Required for Estimating the Variance Within d Units of the True Value.....	438-440
GUENTHER, WILLIAM C. AND TERRAGNO, PAUL J. A Review of the Literature on a Class of Coverage Problems.....	232-260
GUTTMAN, IRWIN AND TIAO, GEORGE C. A Bayesian Approach to Some Best Population Problems.....	825-835
HÁJEK, JAROSLAV. Asymptotic Theory of Rejective Sampling With Varying Probabilities from a Finite Population.....	1491-1523
HANSON, D. L. AND KOOPMANS, L. H. Tolerance Limits for the Class of Distributions With Increasing Hazard Rates.....	1561-1570
HARKNESS, W. L., BARTOO, J. B. AND SRIVASTAVA, O. P. Asymptotic Distribution of Distances Between Order Statistics From Bivariate Populations.....	748-754
HARKNESS, W. L. AND KATZ, L. Comparison of the Power Functions for the Test of Independence in 2×2 Contingency Tables.....	1115-1127
HARRIS, B., ATKINSON, F. V. AND CHURCH, J. D. Decision Procedures for Finite Decision Problems Under Complete Ignorance.....	1644-1655
HARTIGAN, J. Invariant Prior Distributions.....	836-845
HERZBERG, AGNES M. Two Third Order Rotatable Designs in Four Dimensions.....	445-446
HINKELMANN, KLAUS. Extended Group Divisible Partially Balanced Incomplete Block Designs.....	681-695
HOBBY, CHARLES AND YLVISAKER, N. DONALD. Some Structure Theorems for Stationary Probability Measures on Finite State Sequences.....	550-556
HOEL, P. G. AND LEVINE, A. Optimal Spacing and Weighting in Polynomial Prediction.....	1553-1560
HOFFMAN, A. J. On the Line Graph of the Complete Bipartite Graph.....	883-885
HOGBEN, D., PINKHAM, R. S. AND WILK, M. B. The Moments of a Variate Related to the Non-Central t	298-314
HOGBEN, D., PINKHAM, R. S. AND WILK, M. B. An Approximation to the Distribution of Q (A Variate Related to the Non-Central t).....	315-318

HUBER, PETER J. Robust Estimation of a Location Parameter.....	73-101
INGLEHART, DONALD L. Multivariate Competition Processes.....	350-361
ISAAC, RICHARD. Non-Singular Recurrent Markov Processes Have Stationary Measures.....	869-871
ISAAC, RICHARD. A Uniqueness Theorem for Stationary Measures of Ergodic Markov Processes.....	1781-1786
JAMES, ALAN T. Distributions of Matrix Variates and Latent Roots Derived from Normal Samples.....	475-501
JOHN, PETER W. M. Pseudo-Inverses in the Analysis of Variance....	895-896
JOHN, PETER W. M. Balanced Designs With Unequal Numbers of Replicates.....	897-899
JOHNSON, CHARLES HENRY AND FOLKS, JOHN LEROY. A Property of the Method of Steepest Ascent.....	435-437
KATZ, L. AND HARKNESS, W. L. Comparison of the Power Functions for the Test of Independence in 2×2 Contingency Tables....	1115-1127
KIEFER, J. AND GIRI, N. Local and Asymptotic Minimax Properties of Multivariate Tests.....	21-35
KIEFER, J. AND GIRI, N. Minimax Character of the R^2 -Test in the Simplest Case.....	1475-1490
KHATRI, C. G. Distribution of the Largest or the Smallest Characteristic Root Under Null Hypothesis Concerning Complex Multivariate Normal Populations.....	1807-1810
KHATRI, C. G. Distribution of the "Generalised" Multiple Correlation Matrix in the Dual Case.....	1801-1806
KLOTZ, JEROME. Small Sample Power of the Bivariate Sign Tests of Blumen and Hodges.....	1576-1582
KOOPMANS, L. H. On the Coefficient of Coherence for Weakly Stationary Stochastic Processes.....	532-549
KOOPMANS, L. H. On the Multivariate Analysis of Weakly Stationary Stochastic Processes.....	1765-1780
KOOPMANS, L. H. AND HANSON, D. L. Tolerance Limits for the Class of Distributions With Increasing Hazard Rates.....	1561-1570
KOTLARSKI, IGNACY. On Bivariate Random Variables Where the Quotient of Their Coordinates Follows Some Known Distribution.....	1673-1684
KOTZ, SAMUEL AND ADAMS, JOHN W. Distribution of Sum of Identically Distributed Exponentially Correlated Gamma-Variables.	277-283
KRAFT, CHARLES H. AND VAN EEDEN, CONSTANCE. Bayesian Bio-Assay.....	886-890
KRAFT, CHARLES H. AND VAN EEDEN, CONSTANCE. A Fluctuation Theorem and a Distribution-Free Test.....	1359-1360
LAMPERTI, JOHN. On Extreme Order Statistics.....	1726-1737
LECAM, LUCIEN, SCHWARTZ, LORRAINE AND BREIMAN, LEO. Consistent Estimates and Zero-One Sets.....	157-161

LECAM, L. Sufficiency and Approximate Sufficiency	1419-1455
LEE, P. M. On the Axioms of Information Theory	415-418
LEHMANN, E. L. Asymptotically Nonparametric Inference in Some Linear Models With One Observation per Cell	726-734
LEVINE, A. AND HOEL, P. G. Optimal Spacing and Weighting in Polynomial Prediction	1553-1560
LINDLEY, D. V. The Bayesian Analysis of Contingency Tables	1622-1643
MARDIA, K. V. Some Results on the Order Statistics of the Multi- variate Normal and Pareto Type I Populations	1815-1818
MARSHALL, ALBERT W. AND BARLOW, RICHARD E. Bounds for Dis- tributions with Monotone Hazard Rate, I.	1234-1257
MARSHALL, ALBERT W. AND BARLOW, RICHARD E. Bounds for Dis- tributions with Monotone Hazard Rate, II.	1258-1274
MCCORD, JAMES R. On Asymptotic Moments of Extreme Statistics ..	1738-1745
MEHRA, K. L. Rank Tests for Paired-Comparison Experiments In- volving Several Treatments	122-137
MIJARES, TITO A. On Elementary Symmetric Functions of the Roots of a Multivariate Matrix: Distributions	1186-1198
MILLER, RUPERT G., JR. A Trustworthy Jackknife	1594-1605
MOTT-SMITH, J. C. Two Estimates of the Binomial Distribution.	809-816
MUDHOLKAR, G. S., DAS GUPTA, S. AND ANDERSON, T. W. Mono- tonicity of the Power Functions of Some Tests of the Multi- variate Linear Hypothesis	200-205
NEUTS, MARCEL F. Generating Functions for Markov Renewal Processes	431-434
NEWELL, G. F. Asymptotic Extremes for m -Dependent Random Variables	1322-1325
OLKIN, INGRAM AND RUBIN, HERMAN. Multivariate Beta Dis- tributions and Independence Properties of the Wishart Dis- tributions	261-269
PARK, JOHN H., JR. Variations of the Non-Central t and Beta Dis- tributions	1583-1593
PATHAK, P. K. On Sampling Schemes Providing Unbiased Ratio Estimators	222-231
PATHAK, P. K. Sufficiency in Sampling Theory	795-808
PAULSON, EDWARD. A Sequential Procedure for Selecting the Popu- lation With the Largest Mean From k Normal Populations.	174-180
PAULSON, EDWARD. Sequential Estimation and Closed Sequential Decision Procedures	1048-1058
PERERA, A. G. A. D. AND FOSTER, F. G. Queues With Batch De- partures II.	1147-1156
PFANZAGL, J. On the Topological Structure of Some Ordered Families of Distributions	1216-1228

PILLAI, K. C. SREEDHARAN. On the Moments of Elementary Symmetric Functions of the Roots of Two Matrices.....	1704-1712
PINKHAM, R. S., WILK, M. B. AND HOGBEN, D. The Moments of a Variate Related to the Non-Central t	298-314
PINKHAM, R. S., WILK, M. B. AND HOGBEN, D. An Approximation to the Distribution of Q (A Variate Related to the Non-Central t).....	315-318
PITCHER, TOM S. On Adding Independent Stochastic Processes....	872-873
PORT, SIDNEY C. Some Theorems on Functionals of Markov Chains.	1275-1290
PORT, SIDNEY C. Escape Probability for a Half Line.....	1351-1355
PROSCHAN, FRANK AND BARLOW, RICHARD E. Comparison of Replacement Policies, and Renewal Theory Implications.....	577-589
PRUITT, WILLIAM E. Eigenvalues of Non-Negative Matrices.....	1797-1800
PURI, MADAN LAL. Asymptotic Efficiency of a Class of c -Sample Tests.....	102-121
PYKE, RONALD AND SCHAUFFELE, RONALD. Limit Theorems for Markov Renewal Processes.....	1746-1764
RAGHAVARAO, DAMARAJU. Singular Weighing Designs.....	673-680
RAGHAVARAO, D. AND CHANDRASEKHARARAO, K. Cubic Designs.....	389-397
RAJ, DES. On Double Sampling for PPS Estimation.....	900-902
REMAGE, RUSSELL, JR. AND THOMPSON, W. A., JR. Rankings From Paired Comparisons.....	739-747
RIORDAN, JOHN. The Enumeration of Election Returns by Number of Lead Positions.....	369-379
ROBBINS, HERBERT. The Empirical Bayes Approach to Statistical Decision Problems.....	1-20
ROBERTS, CHARLES DEWITT. An Asymptotically Optimal Fixed Sample Size Procedure for Comparing Several Experimental Categories With a Control.....	1571-1575
ROGERS, GERALD S. An Application of a Generalized Gamma Distribution.....	1368-1370
ROSENBLATT, JUDAH AND BLUM, J. R. On Random Sampling From a Stochastic Process.....	1713-1717
ROSENBLATT-ROTH, M. Some Theorems Concerning the Strong Law of Large Numbers for Non-Homogeneous Markov Chains.....	566-576
ROSS, JOHN AND WEITZMAN, R. A. The Twenty-Seven Per Cent Rule.....	214-221
RUBIN, HERMAN AND FOX, MARTIN. Admissibility of Quantile Estimates of a Single Location Parameter.....	1019-1030
RUBIN, HERMAN AND OLKIN, INGRAM. Multivariate Beta Distributions and Independence Properties of the Wishart Distributions.....	261-269
SAKRISON, DAVID J. A Continuous Kiefer-Wolfowitz Procedure for Random Processes.....	590-599

SAMUEL, ESTER. Convergence of the Losses of Certain Decision Rules for the Sequential Compound Decision Problem.....	1606-1621
SCHAUFELLE, RONALD AND PYKE, RONALD. Limit Theorems for Markov Renewal Processes.....	1746-1764
SCHWARTZ, LORRAINE, BREIMAN, LEO AND LeCAM, LUCIENE. Consistent Estimates and Zero-One Sets.....	157-161
SEBER, G. A. F. Orthogonality in Analysis of Variance.....	705-710
SEBER, G. A. F. The Linear Hypothesis and Large Sample Theory....	773-779
SETHURAMAN, J. On the Probability of Large Deviations of Families of Sample Means.....	1304-1316
SHAH, K. R. Use of Inter-Block Information to Obtain Uniformly Better Estimators.....	1064-1078
SHAH, S. M. An Upper Bound for the Number of Disjoint Blocks in Certain PBIB Designs.....	398-407
SHEPP, L. A. A Local Limit Theorem.....	419-423
SHEPP, L. A. A Limit Law Concerning Moving Averages.....	424-428
SILVEY, S. D. On a Measure of Association.....	1157-1166
SINKHORN, RICHARD. A Relationship Between Arbitrary Positive Matrices and Doubly Stochastic Matrices.....	876-879
SMILEY, M. F. The Spectral Theorem for Finite Matrices and Cochran's Theorem.....	443-444
SRIVASTAVA, J. N. AND BOSE, R. C. On a Bound Useful in the Theory of Factorial Designs and Error Correcting Codes.....	408-414
SRIVASTAVA, O. P., HARKNESS, W. L. AND BARTOO, J. B. Asymptotic Distribution of Distances between Order Statistics From Bivariate Populations.....	748-754
STRATTON, HOWARD H., JR. AND TUCKER, HOWARD G. Limit Distributions of a Branching Stochastic Process.....	557-565
SWITZER, PAUL. Significance Probability Bounds for Rank Orderings.....	891-894
TAKÁCS, LAJOS. An Application of a Ballot Theorem in Order Statistics.....	1356-1358
TANIS, ELLIOT A. Linear Forms in the Order Statistics From an Exponential Distribution.....	270-276
TERRAGNO, PAUL J. AND GUENTHER, WILLIAM C. A Review of the Literature on a Class of Coverage Problems.....	232-260
THEDÉEN, TORBJÖRN. A Note on the Poisson Tendency in Traffic Distribution.....	1823-1824
THOMPSON, J. W. A Property of Some Symmetric Two-Stage Sequential Procedures.....	755-761
THOMPSON, W. A., JR. AND REMAGE, RUSSELL, JR. Rankings From Paired Comparisons.....	739-747
TIAO, GEORGE C. AND GUTTMAN, IRWIN. A Bayesian Approach to Some Best Population Problems.....	825-835

TRACY, D. S. AND DWYER, P. S. A Combinatorial Method for Products of Two Polykays With Some General Formulae.....	1174-1185
TRAWINSKI, IRENE MONAHAN AND BARGMANN, R. E. Maximum Likelihood Estimation With Incomplete Multivariate Data....	647-657
TUCKER, HOWARD G. On Continuous Singular Infinitely Divisible Distribution Functions.....	330-335
TUCKER, HOWARD G. AND STRATTON, HOWARD H., JR. Limit Distributions of a Branching Stochastic Process.....	557-565
USISKIN, ZALMAN. Probabilities in the Voting Paradox.....	857-862
VAN EEDEN, CONSTANCE AND KRAFT, CHARLES H. Bayesian Bio-Assay.....	886-890
VAN EEDEN, CONSTANCE AND KRAFT, CHARLES H. A Fluctuation Theorem and a Distribution-Free Test.....	1359-1360
VILLEGAS, C. Confidence Region for a Linear Relation.....	780-788
VILLEGAS, C. On Qualitative Probability σ -Algebras.....	1787-1796
WALKER, A. M. AND ANDERSON, T. W. On the Asymptotic Distribution of the Auto Correlations of a Sample From a Linear Stochastic Process.....	1296-1303
WEEKS, DAVID L. AND BAIN, LEE J. A Note on the Truncated Exponential Distribution.....	1366-1367
WEITZMAN, R. A. AND ROSS, JOHN. The Twenty-Seven Per Cent Rule.....	214-221
WELCH, PETER D. On Pre-Emptive Resume Priority Queues.....	600-612
WILK, M. B. AND GNANADESIKAN, R. Graphical Methods for Internal Comparisons in Multiresponse Experiments.....	613-631
WILK, M. B., HOGBEN, D. AND PINKHAM, R. S. The Moments of a Variate Related to the Non-Central t	298-314
WILK, M. B., HOGBEN, D. AND PINKHAM, R. S. An Approximation to the Distribution of Q (A Variate Related to the Non-Central t).....	315-318
WILLIAMSON, E. AND BRETHERTON, M. H. Tables of the Logarithmic Series Distribution.....	284-297
WURTELE, ZIVIA S. AND BREIMAN, LEO. Convergence Properties of a Learning Algorithm.....	1819-1822
YEN, E. H. On Two-Stage Non-Parametric Estimation.....	1099-1114
YLVISAKER, N. DONALD. Lower Bounds for Minimum Covariance Matrices in Time Series Regression Problems.....	362-368
YLVISAKER, N. DONALD AND HOBBY, CHARLES. Some Structure Theorems for Stationary Probability Measures on Finite State Sequences.....	550-556
ZACKS, S. Generalized Least Squares Estimators for Randomized Fractional Replication Designs.....	696-704
ZACKS, S. AND CHERNOFF, H. Estimating the Current Mean of a Normal Distribution Which is Subjected to Changes in Time....	999-1018

- ZELEN, M. AND FEDERER, W. Applications of the Calculus for Factorial Arrangements II: Two Way Elimination of Heterogeneity.. 658-672

BOOK REVIEWS

- DALENIUS, TORE. Review of "Sampling Techniques," (2nd ed.) by William G. Cochran 1381-1382
- DERMAN, C. Review of "Renewal Theory," by D. R. Cox 448-449
- GILBERT, E. N. Review of "The Method of Paired Comparisons," by H. A. David. 1386-1387
- GNEDENKO, B. Review of "Random Processes," by M. Rosenblatt.. 1832-1833
- GRENANDER, ULF. Review of "The Theory of Probability," (translated from the Russian by B. D. Seckler), by B. V. Gnedenko.... 920-922
- KEMPTHORNE, OSCAR. Review of "Mathematics of Design and Analysis of Experiments," by M. C. Chakrabarti 911-912
- KENDALL, DAVID G. Review of "Stochastic Service Systems," by John Riordan..... 917-919
- KIEFER, J. Review of "The Advanced Theory of Statistics, Volume 2, "Inference and Relationship," " by Maurice G. Kendall and Alan Stuart..... 1371-1380
- MILLER, RUPERT G., JR. Review of "Introduction to the Theory of Queues," by Lajos Takács 450-453
- MITRA, S. K. AND RAO, C. R. Review of "Contributions to Order Statistics," by A. E. Sarhan and B. B. Greenberg (editors) 1383-1385
- MOOD, ALEX M. Review of "Bibliography of Nonparametric Statistics," by I. Richard Savage..... 915-916
- ORE, OYSTEIN. Review of "Games, Gods and Gambling. The Origins and History of Probability and Statistical Ideas from the Earliest Times to the Newtonian Era," by F. N. David 447
- PEARSON, E. S. Review of "Handbook of Statistical Tables," by Donald B. Owen..... 903-906
- RAO, C. R. AND MITRA, S. K. Review of "Contributions to Order Statistics," by A. E. Sarhan and B. B. Greenberg (editors) 1383-1385
- REICH, EDGAR. Review of "General Stochastic Processes in the Theory of Queues," by Václav E. Beneš..... 913-914
- SCHMETTERER, LEOPOLD K. Review of "Wahrscheinlichkeitsrechnung, mit einem Anhang über Informationstheorie," by A. Rényi..... 1828-1831
- WELCH, B. L. Review of "New Tables of the Non-Central t Distribution," by M. O. Locks, M. J. Alexander and B. J. Byars; and "Factors for One-Sided Tolerance Limits and for Variables Sampling Plans," by D. B. Owen..... 907-910

MISCELLANEOUS

Book Reviews.....	447-453, 903-922, 1371-1387, 1828-1833
Correction Notes and Acknowledgment of Priority.....	923-925, 1388, 1827
Abstracts of Papers.....	454-462, 926-940, 1389-1411, 1834-1852
News and Notices.....	463-474, 941-948, 1409-1417, 1853-1880
Doctoral Dissertations in Statistics.....	469-474
Report of the President for 1964.....	1863-1864
Report of the Treasurer for 1964.....	1865-1870
Report of the Editor for 1964.....	1870-1872
Report of the Copenhagen Meeting, July 8-10, 1963.....	945-947
Report of the Monterey, California, Meeting, January 29-30, 1964....	1413-1414
Report of the Manhattan, Kansas, Meeting, May 7-9, 1964.....	1415-1417
Report of the Amherst, Massachusetts, Meeting, August 30-Sep- tember 4, 1964.....	1872-1877
Report of the Berne, Switzerland, Meeting, September 14-16, 1964...	1877-1880
Publications Received.....	474, 947-948, 1417

Index of Abstracts for 1964

- AFIFI, A. AND ELASHOFF, R. M., 1389
 AITCHISON, JOHN, 1399
 ALBERT, ARTHUR, 1403
 ALI, MIR M. AND EHSANES SALEH, A. K. M., 1848
 ALI, MIR M., LUTFUL KABIR, A. B. M., AND EHSANES SALEH, A. K. M., 1848
 ANDREWS, F. C., 1842
 ARMITAGE, J. V. AND KRISHNAIAH, P. R., 926, 1401
 BALDWIN, J. G., 1834
 BARR, D. R., (2) 926
 BARR, D. R. AND RIZVI, M. HASEEB, 1842
 BASU, A. P., (2) 937
 BELL, C. B., 934
 BELL, C. B. AND DOKSUM, KJELL, 1399
 BHARGAVA, T. N. AND CHATTERJI, S. D., 1399
 BHUCHONGKUL, SUBHA AND PURI, MADAN L., 927
 BICKEL, PETER J., 1403
 BICKEL, PETER J. AND YAHAV, JOSEPH A., 933
 BLACKWELL, DAVID AND KENDALL, DAVID G., 460
 BLUSCHKE, WALLACE R., 454
 BLUMENTHAL, S., CHRISTIE, T. AND SOBEL, M., 1834
 BRADU, DAN, 1403
 BRILLINGER, DAVID R., 1403
 BRUNK, H. D., 1389
 BUEHLER, R. J. AND HORA, R. B., 455
 CACOULOS, THEOPHILOS, 927, 1834
 CHATTERJEE, SAMPRIT, 1390
 CHATTERJI, S. D. AND BHARGAVA, T. N., 1399
 CHERNOFF, HERMAN AND RAY, S. N., 1390
 CHIANG, CHIN LONG, 1390
 CHOVER, J. AND NEY, P. E., 1391
 CHRISTIE, T., SOBEL, M. AND BLUMENTHAL, S., 1834
 COOPER, DAVID B., 1404
 COX, HENRY, 935
 CRASSWELL, K. J., HANSON, D. L. AND OWEN, D. B., 457
 CRAWFORD, G. B. AND SAUNDERS, S. C., 454
 CROW, EDWIN L., 927
 CSÖRGO, MIKLÓS, (2) 1400
 CUTHBERT, DANIEL, 1846
 DAVE, P. H. AND SHAH, B. K., 1849
 DAVID, H. T. AND LAWING, WILLIAM D., 1835
 DERMAN, CYRUS, 935, 1405
 DESHPANDE, JAYANT V., 937
 DOKSUM, KJELL AND BELL, C. B., 1399
 DUBEY, SATYA D., (2) 1391
 DU BOIS, N. S. D'ANDREA, JR., 1404
 DWASS, MEYER, 1392
 EFRON, BRADLEY, 1846
 EHSANES SALEH, A. K. M. AND ALI, MIR M., 1848
 EHSANES SALEH, A. K. M., ALI, MIR M. AND LUTFUL KABIR, A. B. M., 1848
 EICKER, F., 1842
 ELASHOFF, R. M., 1405
 ELASHOFF, R. M. AND AFIFI, A., 1389
 FERGUSON, THOMAS S., 454
 FRASER, D. A. S., 1392
 GABRIEL, KUNO RUBEN, 1400
 GANI, JOSEPH M. AND NAGAI, T., 1835
 GART, JOHN J., 927, 932
 GASTWIRTH, JOSEPH L., 454
 GEBHARDT, FRIEDRICH, 1843
 GEISSER, SEYMOUR, 1835
 GELZER, J. W. AND PYKE, RONALD, 1849
 GHOSH, B. K., 928

- GIDEON, RUDY AND PYKE, RONALD, 1849
GIRI, NARAYAN CHANDRA, 1836
GLUCKMAN, P. M. AND MURTHY, V. K., (2) 1396
GNANADESIKAN, R., PINKHAM, R. S. AND HUGHES, MRS. L. P., 1392
GNANADESIKAN, R., LAUH, E. AND WILK, M. B., 1836
GOBEL, F., 1843
GOLDMAN, AARON, 1392
GOVINDARAJULU, ZAKKULA, 1843
GOVINDARAJULU, ZAKKULA AND SUZUKI, YUKIO, 1393
GUPTA, MILAN KUMAR, 1405
GUPTA, S. S. AND WAKNIS, M. N., 928, 1401
GUTTMAN, IRWIN, 1850
HALTON, JOHN H., 1843
HANNAN, J. F. AND VAN RYZIN, J. R., 1836
HANSON, D. L. AND KOOPMANS, L. H., 455, (2) 1393
HANSON, D. L., OWEN, D. B. AND CRASSWELL, K. J., 457
HARTER, H. LEON, 928, 1393
HEXT, GEORGE R., 1836
HILL, BRUCE M., 460
HINICH, MELVIN, 932
HODGES, J. L., JR., 1837
HOFFMAN, A. J. AND RAY-CHAUDHURI, D. K., 1837
HOGG, ROBERT V., 1837
HORA, R. B. AND BUEHLER, R. J., 455
HØYLAND, ARNLJOT, 938
HUGHES, MRS. L. P., GNANADESIKAN, R. AND PINKHAM, R. S., 1392
HUZURBAZAR, V. S., 929
IGLEHART, DONALD L., 1394
IMHOF, J. P., 938
JOHANSEN, SØREN, 1844
JOHN, PETER W. M., 455
Kabe, D. G., 1406
KAMAT, A. R., (2) 1406
KAPADIA, C. H., 1401
KENDALL, D. G., 1406
KENDALL, DAVID G. AND BLACKWELL, DAVID, 460
KENDALL, D. G. AND LEWIS, T., 1850
KHAMIS, S. H., 938, 939
KIEFER, J. AND SCHWARTZ, R., 1398
KINGMAN, J. F. C., 460
KLOTZ, JEROME, 929, 1847
KONIJN, H. S., 1838
KOOP, J. C., 929, 930
KOOPMANS, L. H. AND HANSON, D. L., 455, (2) 1393
KRAFT, CHARLES H., 456
KRAFT, CHARLES H. AND VAN EEDEN, CONSTANCE, 930
KRISHNAIAH, P. R., 1844
KRISHNAIAH, P. R. AND ARMITAGE, J. V., 926, 1401
KRISHNAIAH, P. R. AND MURTHY, V. K., 930
KRISHNAIAH, P. R. AND RIZVI, M. HASEEB, 1394
LAUH, E., WILK, M. B. AND GNANADESIKAN, R., 1836
LAWING, WILLIAM D. AND DAVID, H. T., 1835
LECHNER, JAMES A., 1838
LEE, P. M., 1406
LEVY, PAUL S., 1394
LEWIS, T. AND KENDALL, D. G., 1850
LUTFUL KABIR, A. B. M., EHSANES SALEH, A. K. M. AND ALI, MIR M., 1848
MACQUEEN, J. AND REDHEFFER, R. M., 939
MAHAMUNULU, D. M., (2) 1850
MAITRA, ASHOK, 1402
MALLOWS, C. L. AND RICHTER, DONALD, 460
MANDL, PETR, 1844
MANN, NANCY R., 456, 1838
MARDIA, K. V., 461

- MARSHALL, ALBERT W. AND OLKIN, INGRAM, 456
- MAZUY, KAY K. AND VENEZIAN, E. C., 1395
- McCLOSKEY, JOHN WILLIAM, 1839
- McFADDEN, J. A. AND MEHR, C. B., 457
- MEHR, C. B. AND McFADDEN, J. A., 457
- MEHRA, K. L., 1839
- MENON, M. V., 1395
- MILES, R. E., 1407
- MOORE, ERIN AND PYKE, RONALD, 1851
- MORRISON, MILTON AND TOBIAS, FILBERT, 934
- MOSER, JOSEPH M., 457
- MUDHOLKAR, G. S., 1395, 1839
- MURTHY, V. K., 457
- MURTHY, V. K. AND GLUCKMAN, P. M., (2) 1396
- MURTHY, V. K. AND KRISHNAIAH, P. R., 930
- NAGAI, T. AND GANI, JOSEPH M., 1835
- NARAYANA, T. V. AND SARANGI, J., 1840
- NAUS, JOSEPH I., 1396
- NEUTS, MARCEL F., 1840
- NEY, P. E. AND CHOVER, J., 1391
- NÜESCH, PETER E., 1844
- OLKIN, INGRAM AND MARSHALL, ALBERT W., 456
- OOSTERHOFF, J., 1845
- OWEN, D. B., CRASSWELL, K. J. AND HANSON, D. L., 457
- PARENT, E. A., 1845
- PARZEN, EMANUEL, 935
- PATEL, M. S., 939
- PATHAK, P. K., 459
- PINKHAM, R. S., HUGHES, MRS. L. P. AND GNANADESIKAN, R., 1392
- PURI, MADAN L., 461
- PURI, MADAN L. AND BHUCHONGKUL, SUBHA, 927
- PYKE, RONALD AND GELZER, J. W., 1849
- PYKE, RONALD AND GIDEON, RUDY, 1849
- PYKE, RONALD AND MOORE, ERIN, 1851
- PYKE, RONALD AND SMITH, CARTER V., 1851
- RAO, J. N. K., 1845
- RAO, K. KOTESWARA, 1852
- RAO, M. M., 1396
- RAY, S. N., 1397
- RAY, S. N. AND CHERNOFF, HERMAN, 1390
- RAY-CHAUDHURI, D. K. AND HOFFMAN, A. J., 1837
- REDHEFFER, R. M. AND MACQUEEN, J., 939
- RICHTER, DONALD AND MALLOWS, C. L., 460
- RIFFENBURGH, ROBERT H., 1402
- RIZVI, M. HASEEB, 930
- RIZVI, M. HASEEB AND BARR, D. R., 1842
- RIZVI, M. HASEEB AND KRISHNAIAH, P. R., 1394
- ROBINSON, ENDERS A., 936
- RODINE, ROBERT H., 931
- ROGERS, GERALD S., 458
- ROSENBLATT, M. AND VAN NESS, J. W., 936
- RUBEN, H., 458
- SAMUELS, STEPHEN M., 1841
- SANDELIUS, MARTIN, 1407
- SARANGI, J. AND NARAYANA, T. V., 1840
- SAUNDERS, S. C. AND CRAWFORD, G. B., 454
- SCHATZOFF, MARTIN, 1397
- SCHEINOK, PERRY A., 1397, 1408
- SCHWARTZ, RICHARD E., 939 1398
- SCHWARTZ, R. AND KIEFER, J., 1398
- SEHGAL, V. M., 1852
- SEIDEN, ESTHER, 1841

- SESHADRI, V., 1841
SETHURAMAN, J., 933
SHAH, B. K. AND DAVE, P. H., 1849
SHANGHAG, D. N., 461, 1852
SIDDIQUI, M. M., 459, 931
SMITH, ARMAND V., JR., 931
SMITH, CARTER V., AND PYKE
RONALD, 1851
SOBEL, M., BLUMENTHAL, S. AND
CHRISTIE, T., 1834
SPRINGER, MELVIN D. AND THOMPSON,
WILLIAM E., 932
SRIVASTAVA, J. N., 1389
SRIVASTAVA, M. S., 459, 933, 1847,
1848
SRIVASTAVA, O. P., 459
SUBRAHMANYAM, K., 462
SUZUKI, YUKIO AND GOVINDARAJULU,
ZAKKULA, 1393
TAHA, MOHAMED A. H., 934
THOMPSON, WILLIAM E. AND
SPRINGER, MELVIN D., 932
TOBIAS, FILBERT AND MORRISON,
MILTON, 934
TORRENS-IBERN, J., 1402
UPPULURI, V. R. RAO, 1841
URY, HANS K., 940
VAN DER LAAN, P., 1845
VAN EEDEN, CONSTANCE AND KRAFT,
CHARLES H., 930
VAN NESS, J. W. AND ROSENBLATT,
M., 936
VAN ZWET, W. R., 1846
VAN RYZIN, J. R., 1847
VAN RYZIN, J. R. AND HANNAN, J.
F., 1836
VENEZIAN, E. C. AND MAZUY, KAY K.,
1395
WAKNIS, MRUDULLA N. AND GUPTA,
SHANTI S., 928, 1401
WEINER, HOWARD, 1398
WHITE, LEON S., 1408
WILK, M. B., GNANADESIKAN, R. AND
LAUH, E., 1836
YAHAV, JOSEPH A., 936
YAHAV, JOSEPH A. AND BICKEL, PETER
J., 933

